

*Mineral and Technical Surveys, Geographical Branch*  
 DEPT OF MINES AND TECHNICAL SURVEYS

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## GEOGRAPHICAL BRANCH

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### FOREIGN GEOGRAPHY TOPICAL SERIES

1

THE SUEZ CANAL

D.K. Doherty

One of the principal current problems of the Middle East<sup>1</sup> has a geographical aspect. It concerns the use of land, sea and air routes through the region. The most important is the Suez Canal -- a link in world sea communication significant to the region itself and vital to the countries of the Atlantic and Indian Oceans.

The present Suez Canal is the modern expression of a long-held desire for communication between the Mediterranean and Red Seas. From 1200 B.C. into the present regime, a canal connected the Nile with the Red Sea. A thousand years of intercourse made such a link necessary again. Built under the leadership of Ferdinand de Lesseps, the new canal permitted vessels to pass directly from the Nile to the sea.

The Canal cuts across the Isthmus of Suez which is not marked by any outstanding physical obstacles. Forming part of the same depression (rift valley) which joins the Red Sea, the isthmus has been built up through a combination of the earth's crust and deposition by the Nile River and Red Sea. The whole area is flat and sandy, nowhere more than 50 feet above the level of the sea.

#### Location of the Canal

The uniform character of the isthmus enabled a relatively straight sea-rail line to be dug. Of 101 statute miles, approximately 88 are in a straight line (figure 1). Swamps and former lake depressions make up the Canal route, but for three quarters of the total length is ditch proper. Immediately out of the Canal the route stretches through the swamp of Lake Menzala between dikes. The lakes, dredged channels provide a deep water route. Lesser depths of deep water on either side, 19 to 25 feet in Lake Timsah, 18 to 42 feet in Lake Bitter Lake and about 17 feet in Little Bitter Lake.

Since the Suez Canal was opened in 1869 its traffic has increased greatly. Obviously its dimensions have become too small. Improvements have produced a Canal with an overall depth of 42 feet, and a varying surface width. South of the Canal the width is about 390 feet. Most of the Canal is 295 to 330 feet wide.

The Middle East as understood for these purposes consists of the following: Egypt, the states of the Arabian Peninsula, Israel, Syria, Jordan, Iraq and Iran.

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CANADA

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### FOREIGN GEOGRAPHY TOPICAL SERIES

Paper No. 1

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D.K. Doherty

One of the principal current problems of the Middle East<sup>1</sup> has a geographical basis. It concerns the use of land, sea and air routes through the region. Of these, the most important is the Suez Canal -- a link in world sea communications significant to the region itself and vital to the countries of the Atlantic and Indian Oceans.

The present Suez Canal is the modern expression of a long-held desire for water communication between the Mediterranean and Red Seas. From 1200 B.C. into the Arab regime, a canal connected the Nile with the Red Sea. A thousand years later world intercourse made such a link necessary again. Built under the leadership of Ferdinand de Lesseps, the new canal permitted vessels to pass directly from sea to sea.

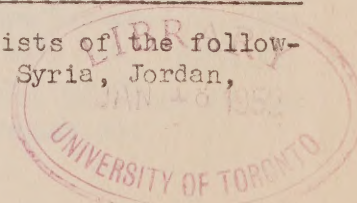
The Canal cuts across the Isthmus of Suez which is not marked by any outstanding physical obstacles. Forming part of the same depression (rift valley) that contains the Red Sea, the isthmus has been built up through a combination of uplift of the earth's crust and deposition by the Nile River and Red Sea. Today the whole area is flat and sandy, nowhere more than 50 feet above the level of the sea.

#### Character of the Canal

The uniform character of the isthmus enabled a relatively straight sea-level canal to be dug. Of 101 statute miles, approximately 88 are in a straight line (Figure 1). Swamps and former lake depressions make up the Canal route, but more than three quarters of the total length is ditch proper. Immediately out of Port Said the route stretches through the swamp of Lake Menzala between dikes. Through the lakes, dredged channels provide a deep water route. Lesser depths bound the deep water on either side, 19 to 25 feet in Lake Timsah, 18 to 42 feet in Great Bitter Lake and about 17 feet in Little Bitter Lake.

Since the Suez Canal was opened in 1869 its traffic has increased greatly. Simultaneously its dimensions have become too small. Improvements have produced a Canal with an overall depth of 42 feet, and a varying surface width. South of Port Said the width is about 390 feet. Most of the Canal is 295 to 330 feet wide.

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The width of the bottom has grown from 72 feet to 148 feet and 180 feet on the bends. One of several post-war projects presently under way will add an additional 20 inches to the depth thus accommodating large tankers which form a vital part of Suez traffic.

Widening and deepening have not solved all the problems arising from the use of the Canal by a greater number of larger vessels. Grounding dangers and shore disintegration from shipwash has held transit speeds to 7 to 8 knots. In addition, the width of the waterway did not permit approaching ships to pass while both were in motion. It was necessary for one vessel to tie up while another passed. Night traverses diminished this delay somewhat as did a convoy system. Under the latter arrangement ten ships moved in one direction at a time each with a Suez Canal Company pilot on board. However, convoys could pass only in the lakes and delays of 24 hours were becoming increasingly common especially because of the bottleneck in the Port Said-Lake Timsah section. This is to be met by cutting a by-pass canal from Ballah to Ferdan. Named after the King of Egypt, the Farouk By-Pass extends for 7½ miles and permits the passage of vessels in a most critical section and thus alleviates delays in transit.<sup>1</sup>

### Canal Traffic

Two great canals connect international waters of first importance. These are the Suez and the Panama. The former carries the larger volume of traffic. This is indicated by Table 1(A).

TABLE I

(A)			(B)		
CANAL ANNUAL TRAFFIC IN CARGO TONS <sup>2</sup>			CANAL ANNUAL TRAFFIC IN NET TONS <sup>2</sup>		
<u>Year</u>	<u>Suez</u>	<u>Panama</u>	<u>Year</u>	<u>Suez</u>	<u>Soo</u>
1948	49.369 million	24.109 million	1948	55.081 million	115.893 million
1949	61.054 million	25.305 million	1949	68.863 million	96.188 million
1950	72.609 million	28.872 million	1950	81.796 million	106.197 million

Statistics for the number of vessels in transit also show the Suez to be the busier canal. For example, in 1949, more than ten thousand vessels passed through the Middle East waterway, while less than five thousand used the Panama. However, the movement on the Suez Canal is less than that on the "Soo" Canals of North America. On the basis of comparable data available, Table I(B) shows that more than ninety-five million net tons moved between Lakes Superior and Huron.

As regards traffic through the Suez Canal alone, tonnages have reached the highest point in that waterway's history. The net tonnages of Table 2 for each decade reveal a more or less steady increase to the present figure. Table 3 indicates its rapid recovery since the Second World War.

<sup>1</sup> Average time en route through the canal in 1938 was 11 hours, 31 minutes.

<sup>2</sup> Suez figures from Bulletin de la Compagnie Universelle du Canal Maritime de Suez. No. 2259 March 15/25 1951. Supplement.

Panama figures from Annual Report, Lake Carriers Association. 1949, 1950.

Soo figures from Annual Report, Lake Carriers Association. 1949, 1950.



TABLE 2

NET TONNAGES BY TEN-YEAR PERIODS <sup>1</sup>	
1870	.436 million tons
1880	3.057 million tons
1890	6.890 million tons
1900	9.738 million tons
1910	16.581 million tons
1920	17.575 million tons
1930	31.668 million tons
1940	13.536 million tons
1950	81.796 million tons

TABLE 3

NET TONNAGES SINCE THE SECOND WORLD WAR <sup>2</sup>	
1945	25.065 million tons
1946	32.732 million tons
1947	36.577 million tons
1948	55.081 million tons
1949	68.863 million tons
1950	81.796 million tons

These total tonnage figures reveal the importance of Suez as the transit route between the markets of the North Atlantic community and those of Asia and Oceania. An appreciation of the importance of Suez in international exchange can best be achieved when considered against a background of world political and economic activity. Figure 2 assists in the interpretation of the Canal's traffic fluctuations associated with these events.

By the end of 1914 traffic had declined only slightly, from the previous high of 1912. With the extension of the First World War the total tonnage moving through the Canal dropped sharply to 8.369 million tons in 1917. An upward trend was restored rather quickly to continue with a healthier economy and greater world political stability to a new high of 33.466 million tons in 1929. The economic depression is revealed in the decline to 28.340 million tons in 1932 and a secondary slump in 1938. The latter recession, coupled with a worsening international political situation, and the start of the Second World War, carried Suez tonnage downward to 7.028 million tons in 1942. Changes in the general war outlook in Africa in 1942 and Southern Europe in 1943 were reflected in a steady increase once again, so that by the end of 1944, total traffic was 34% higher than it had been in 1940.

It would appear that traffic in the Suez Canal has reacted much more noticeably to extreme world political crises than to economic crises. The decline in the latter case, by 1933, was 15% of the 1929 figure. During the two World Wars the declines to low points were 57% and 86% of 1914 and 1939 totals respectively. This near collapse of Suez traffic in wartime is related to the strategic importance of the whole Middle East area, enhanced, no doubt, by the presence of the Canal itself. In each war, military activity, or the threat thereof in and about the Mediterranean and the Middle East, has decreased the flow of traffic through the Canal.

This traffic is carried by the vessels of many states. In 1950 the ships of 33 countries contributed to the Suez Canal's total net tonnages. Practically 97% represented a dozen states, but more than 50% flew the flags of three. It appears that during most of its history more than half of the Canal's traffic has been from three states though not always from the same three (Table 4). While British vessels have continued to be the largest users of the Canal their relative share has declined. The share in the total held by the top three has also decreased, indicating a steadily greater international representation along the waterway.

<sup>1</sup> Data 1870-1930 from Schonfield, Hugh J. The Suez Canal, p. 111, 1940, 1950 from Bulletin de la Compagnie Universelle du Canal Maritime de Suez No. 2250 June 15, 1950, No. 2259. March 15/25, 1951. Supplement.

<sup>2</sup> Data from Bulletin de la Compagnie Universelle du Canal Maritime de Suez No. 2250 June 15, 1950, No. 2259. March 15/25, 1951. Supplement.



TABLE 4

PERCENT OF TOTAL NET TONNAGE BY COUNTRY					
Average 1870-1880 <sup>1</sup>		1938 <sup>1</sup>		1950 <sup>2</sup>	
Great Britain	76.1%	Great Britain	50.4%	Great Britain	32.5%
France	8.3%	Italy	13.4%	Norway	14.1%
Holland	4.1%	Germany	9.1%	United States	10.1%
TOTAL	<u>88.5%</u>		<u>72.9%</u>		<u>56.7%</u>

The Canal's traffic is obviously a two-way movement, from the Red Sea to the Mediterranean and reverse.<sup>3</sup> Between the two there is a distinct lack of balance. Measured by tons of cargo, the S/N flow is much heavier than the N/S. This is illustrated by latest available figures in Table 5. Just as there is a

TABLE 5

COMPARISON OF NORTH-SOUTH AND SOUTH-NORTH TRAFFIC BY VOLUME <sup>4</sup>			
	Year	N/S	S/N
	1950	12.141 million tons	60.468 million tons
1st 6 mths	1951	7.531 million tons	29.468 million tons
June	1951	1.470 million tons	5.080 million tons

contrast between the amount of cargo moving south so there is a contrast in the commodity groups which comprise the two traffic streams as shown in Table 6.

Examination of this traffic indicates that the N/S cargo is composed largely of processed or semi-processed goods. The counter-flow is principally of raw materials. Of the largest commodity group in the latter, petroleum and petroleum products, almost three-quarters is crude oil. The largest commodity group of N/S traffic is 13.5% of the total with 27.5% classed as "Others", whereas S/N traffic shows petroleum to be 78.6% of the total, with only 3.3% unclassified. Thus N/S diversification becomes apparent.

The traffic picture presented by the 1950 statistics is not a new one. Table 7 shows that the same situation prevailed before the Second World War.

<sup>1</sup> Adapted from Siegfried, André. Suez, Panama et les Routes Maritimes Mondiales. p. 96.

<sup>2</sup> Bulletin de la Compagnie Universelle du Canal Maritime de Suez No. 2259 March 15/25, 1951. Supplement.

<sup>3</sup> The movement of traffic from the Red Sea to the Mediterranean Sea is described as South-North and is henceforth abbreviated as S/N. Similarly the North-South traffic, Mediterranean Sea to the Red Sea, is shortened to N/S.

<sup>4</sup> Total 1950 figures from Bulletin de la Compagnie Universelle du Canal Maritime de Suez No. 2259 March 15/25, 1951. Supplement. Others from Fairplay. Vol. 177, No. 3563 September 6, 1951, p. 563. Vol. 177 No. 3564 September 13, 1951. p. 610.



TABLE 6

COMPARISON OF NORTH-SOUTH AND SOUTH-NORTH TRAFFIC BY COMMODITY, 1950 <sup>1</sup>					
(in millions of tons and percent of flow)					
1950	N/S		1950	N/S	
Worked Metals	1.642	13.5%	Petroleum & Petroleum		
Cement	1.110	9.1%	Products	47.526	78.6%
Fertilizer	1.089	9.0%	Minerals & Metals	2.212	3.7%
Machinery	1.083	8.9%	Cereals	2.061	3.4%
Cereals	.779	6.4%	Raw Fibres	1.489	2.5%
Sugar	.590	4.9%	Oil Seeds	1.444	2.4%
Coal & Coke	.549	4.5%	Rubber	1.356	2.2%
Chemical Products	.456	3.8%	Sugar	.428	.7%
Pulp & Paper	.450	3.7%	Vegetable Oils	.372	.6%
Railway Equipment	.377	3.1%	Tea	.336	.5%
Beverages	.194	1.6%	Wood	.307	.5%
Salt	.161	1.3%	Processed Jute	.303	.5%
Wood	.118	.9%	Fruits	.282	.5%
Petroleum	.111	.9%	Oilcake	.186	.3%
Raw Cotton	.110	.9%	Phosphates	.170	.3%
Others	3.322	27.5%	Others	1.996	3.3%
TOTAL	12.141	100%	TOTAL	60.468	100%

TABLE 7

COMPARISON OF NORTH-SOUTH AND SOUTH-NORTH TRAFFIC BY COMMODITY, 1913 & 1938 <sup>2</sup>					
(percent of flow)					
1913	N/S		1913	S/N	
Metals, Machinery,			Cereals		27.0%
Rly. Equipment	25.5%		Vegetable Oils		18.0%
Coal	10.5%		Raw Fibres		12.0%
Oil	4.5%		Ores & Metals		10.0%
Salt	3.9%		Petroleum		2.0%
Cement	3.8%		Others		31.0%
Sugar	1.6%				
Fertilizer	0.5%				
Others	49.7%				
TOTAL	100%		TOTAL	100%	

1938	N/S		1938	S/N	
Metals, Machinery			Petroleum		24.8%
Rly. Equipment	28.3%		Vegetable Oils		18.6%
Fertilizer	8.4%		Cereals		15.0%
Cement	7.2%		Foodstuffs		10.8%
Wood Pulp	5.0%		Ores & Metals		7.6%
Salt	4.5%		Raw Fibres		6.5%
Oil	3.6%		Oilcake		3.0%
Beverages	3.6%		Rubber		2.4%
Chemical Products	3.0%		Others		11.3%
Coal	2.6%				
Timber	2.0%				
Sugar	1.9%				
Textiles	1.6%				
Others	28.3%				
TOTAL	100%		TOTAL	100%	

<sup>1</sup> From Bulletin de la Compagnie Universelle du Canal Maritime de Suez No. 2259 March 15/25, 1951. Supplement.

<sup>2</sup> From Siegfried, André. Suez, Panama et les Routes Maritimes Mondiales pp. 105, 107.



Processed goods have been the significant items of the N/S movement with raw materials passing in the opposite direction. Diversification, as opposed to large quantities of bulk goods, is also apparent in the earlier percentages. If, however, Tables 6 and 7 are compared, changes can be seen. A greater variety of commodities now pass through the Suez Canal. This is related to the general increase in total cargo tonnage and to the economic development of the Indian Ocean region and the Far East. Not only does Western Europe appear to be deriving more raw materials and foodstuffs in greater variety from this area, but in its turn has been sending larger quantities of more types of goods there. It can also be seen that the relative importance of several commodities has changed. In this regard the vast increase in the proportion which is petroleum is noteworthy.

#### Areas Served by Suez and Competitors

This remarkable increase in petroleum traffic illustrates the Canal's strategic importance as one of the routes by which Middle East oil reaches world markets. In 1950, 99% of petroleum passing northward through the Canal originated in the Middle Eastern fields noted in Table 8. The distribution beyond the Canal was wider with the larger portion going to Great Britain, although Western Europe as a whole took 72% of oil moved through Suez.

TABLE 8

#### SOURCE OF S/N PETROLEUM TRAFFIC THROUGH THE SUEZ CANAL, 1950<sup>1</sup>

Middle East	47.025 million tons
Kuwait	15.709 million tons
Iran	14.174 million tons
Saudi Arabia	13.806 million tons
Bahrein	1.552 million tons
Qatar	1.333 million tons
Egypt	.451 million tons
Indonesia	.347 million tons
Malaya	.147 million tons
Others	.007 million tons
<b>TOTAL</b>	<b><u>47.526 million tons</u></b>

Table 9 shows the sources and destinations of Suez Canal traffic in the Indian Ocean region, the Far East, and Oceania. Here, the developing importance of the Persian Gulf with its oil shipments is clearly indicated. It can also be seen that it is the countries bordering the Indian Ocean which are significant in the Suez traffic, although the focus has shifted from the Indian subcontinent to the Persian Gulf.

The North Atlantic community and the Orient plus Oceania are vital factors in international maritime exchange. In this flow of raw materials and counter-flow of processed goods the Suez Canal competes with the Panama Canal. Each has its area of dominance. Examination of Figures 3 and 4 emphasizes this relationship of the Indian Ocean margins to Suez. The American and North Asian shores

<sup>1</sup> Petroleum Times. Vol. 55 No. 1405 June 15, 1951. p. 532.



TABLE 9

PERCENT OF NET TONNAGE TO AND FROM AREAS EAST OF SUEZ <sup>1</sup>

	1913	1938	1950
India, Pakistan, Burma, Ceylon	45.4%	25.4%	9.1%
China, Japan, Philippines, Siberia	22.1%	20.4%	6.2%
Indonesia, Malaya	9.1%	10.9%	5.5%
French Indo-China, Thailand	3.1%	4.5%	2.0%
Persian Gulf	1.4%	16.6%	63.9%
Red Sea-Gulf of Aden	1.3%	7.6%	1.9%
East Africa	5.1%	6.9%	3.2%
Australasia	9.9%	6.5%	8.1%
Others	2.6%	1.2%	.1%
TOTALS	100%	100%	100%

fall within the domain of Panama. Between these two absolute areas of supremacy, depending on a host of different factors, is a belt which includes Japan, coastal China, the Philippines, and Australia. Here, the point of origin or destination within the North Atlantic, the type of vessel or cargo, need for fuel, canal tolls, and economic and political conditions reflected in market value of cargoes and insurance rates, are all factors which determine the canal to be used.

Competition for the Suez Canal arises also from other sea routes as well as from other forms of transportation. Here again, the many economic and political influences, already implied, put the Suez at an advantage or disadvantage. Thus, the factor of distance is not the only consideration in choosing between the Cape of Good Hope route and the Suez. In this connection, the extent to which distance constitutes a marked advantage varies. Obviously it is much shorter for a vessel to sail from Alexandria to Aden through the Canal than via Gibraltar and the tip of Africa. Less distance is saved as points of origin and destination become progressively farther east and west of Suez. The route from Genoa to Bombay is 58% shorter through the Suez Canal; it is only 23% shorter between Liverpool and Yokohama via Suez. For these reasons the Cape route has remained a most formidable competitor and only slight changes in economic and political conditions can increase the proportion of shipping which goes around Africa.

The Panama Canal and the Cape of Good Hope routes are the Suez Canal's chief competitors. There is no land route which can compete seriously in terms of capacity and cost. These two factors, coupled with current international conflict, preclude use of the Trans-Siberian Railway. Costs of transshipment and lack of a complete route combine with limited capacity and high costs to rule out a link which includes motor transportation or the modern form of the Berlin-Bagdad railway. Only in the realm of passenger movement, mail, and high-class freight can aircraft compete with the Canal.

There is, however, competition in certain stages of the east-west movement. Land routes and alternative transport forms expedite the movement of goods between the Mediterranean and the Persian Gulf. Motor transport is a growing competitor.

<sup>1</sup> Siegfried, André. Suez, Panama et les Routes Maritimes Mondiales, p.102 and Bulletin de la Compagnie Universelle du Canal Maritime de Suez, No. 2259, March 15/25, 1951. Supplement.



Here, too, pipelines are important by-passes of the Canal to speed Middle Eastern oil to tankers at Mediterranean ports. Although, presently, more oil moves to market by tanker through the Suez Canal, existing facilities are significant shortcuts and indicate future developments. By pipeline, Iraq oil eliminates the Canal link completely from the Kirkuk fields to Tripoli and Haifa. Under current conditions 160,000 barrels per day are delivered at the Lebanese port. The recently-completed "Tapline" from Saudi Arabia permits transmission of 300,000 barrels daily which formerly moved by way of Suez. Plans call for an additional 34-inch pipeline from Abadan to the Syrian coast, thus decreasing still further the proportion of Middle East oil passing through the Canal.

#### Conclusions

It can thus be seen that the Suez Canal plays an important yet sensitive role in world trade. Through it moves a vast quantity of products vital to Western Europe and the North Atlantic community as a whole. Likewise, toward the Orient, its traffic is contributing to the economic development of an area in which lives one-half of all mankind. Though the immediate concern of a private company, the character of its operation and influence, focuses international attention on the Suez Canal and emphasizes its importance to all nations.

OTTAWA

December, 1951.



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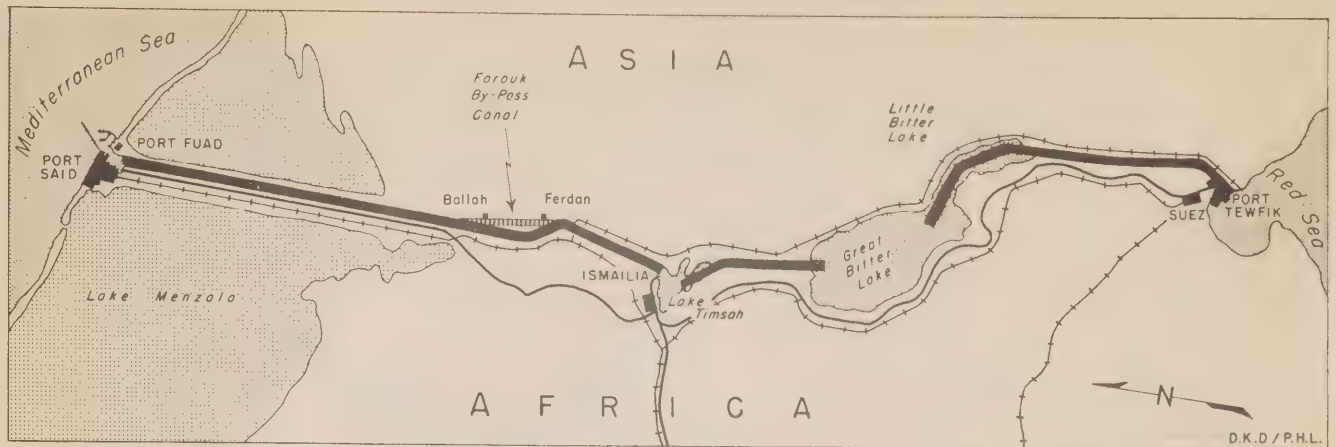
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# PLAN OF THE SUEZ CANAL



Navigation Canal.....  
 Fresh Water Canal.....  
 Railroads.....

Scale in Miles  
 10 5 0 10 20 30

Ocean Water.....  
 Inland Water.....  
 Ports, Cities and Towns.....

G.B.F. 51-140

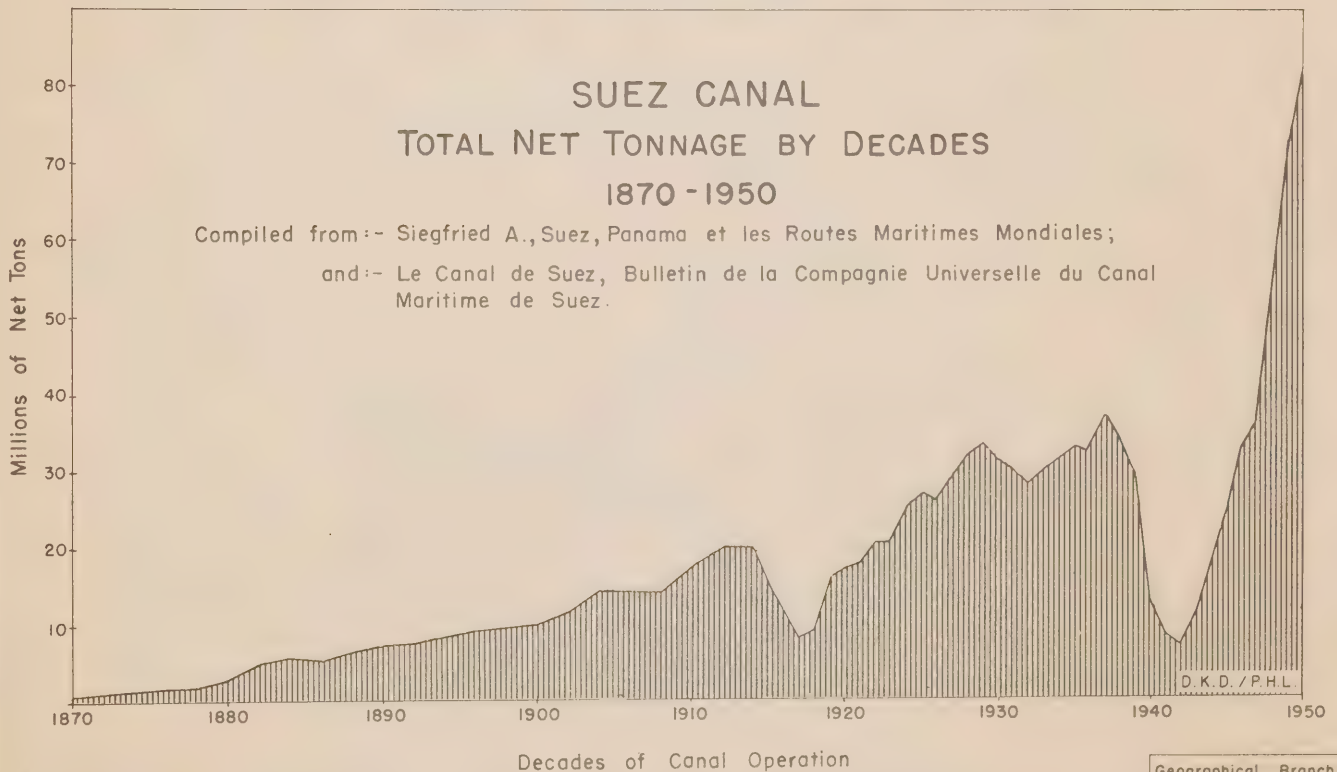
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 Dock and Harbour Authority  
 Vol. 30, Nov. 1949, p. 193.

Geographical Branch  
 Dept. of M.&T.S., 1951

FIG. 1

## SUEZ CANAL TOTAL NET TONNAGE BY DECADES 1870 - 1950

Compiled from:- Siegfried A., Suez, Panama et les Routes Maritimes Mondiales;  
 and:- Le Canal de Suez, Bulletin de la Compagnie Universelle du Canal  
 Maritime de Suez.



G.B.F. 51-141

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FIG. 2







FIG.3 — RESPECTIVE ZONES OF SUEZ AND PANAMA FROM LIVERPOOL  
( Modified after A.Siegfried )

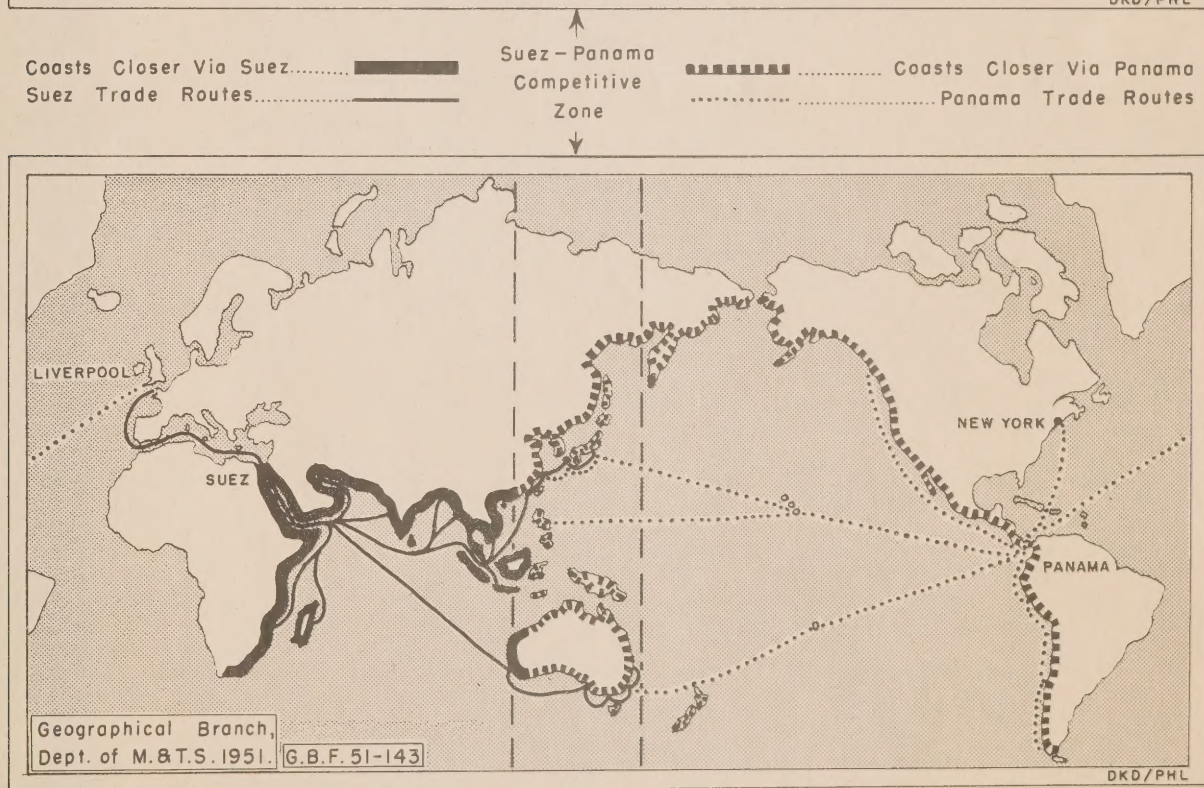
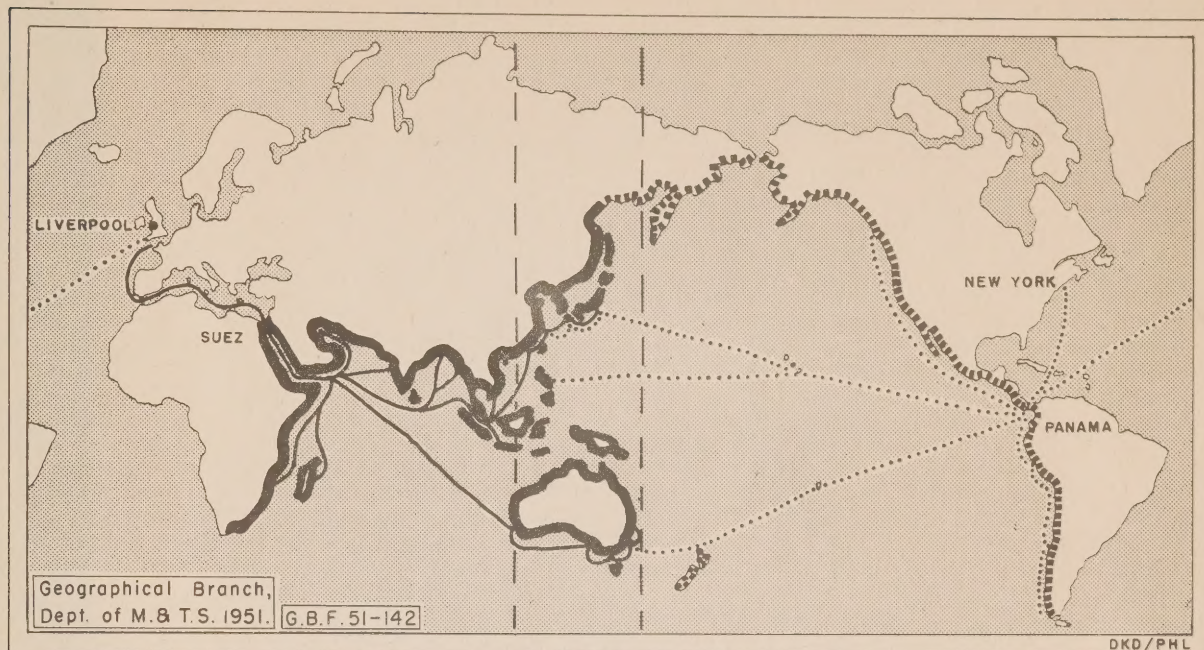


FIG.4 — RESPECTIVE ZONES OF SUEZ AND PANAMA FROM NEW YORK  
( Modified after A.Siegfried )











